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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:

C. Steven McDaniel
Frank M. Raushel
James R. Wild

Serial No.: 07/344,258

Filed: April 27, 1989

For: Recombinant Organo-
phosphorus Acid Anhydrase
and Methods of Use

GROUP 180
Examiner: Unknown

Art Unit: 185

Atty Dkt: TAMK:112

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.97 and 1.98

Honorable Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the references listed on attached Form PTO-1449 be considered by the Examiner and made of record. Copies of the listed references are enclosed for convenience of the Examiner.

In accordance with 37 C.F.R. § 1.97(b), this Information Disclosure Statement is not to be construed as a representation that a search has been made or that no other possibly material information as defined in 37 C.F.R. § 1.56(a) exists.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on July 26, 1989.

Karen T. Burlison
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Date July 25, 1989

The comments contained in this Information Disclosure Statement are believed to constitute a concise explanation of the relevance of each listed reference to the invention claimed in the present application. 37 C.F.R. § 1.98(a). These comments, however, are not intended to take the place of the Examiner's complete consideration of each listed reference.

Reference AA, U.S. Patent No. 3,515,644, discloses a means of detecting toxic vapors and aerosols of anticholinesterase chemical agents, for example G and V agents, by a dual substrate and enzyme-catalyst method. Crystalline bovine plasma albumin hydrolyzes an indophenyl ester to the free indophenol. [Col. 1, lines 20-23; Col. 2, lines 10-12].

Reference AB, U.S. Patent No. 4,781,959, discloses a protective material for decomposing and decontaminating chemical and biological agents that are said to be or contain a composition of the enzyme type, e.g., a phosphoryl phosphatase, and/or the class of substances exemplified by ortho-iodosobenzoic acid, the oxidating properties of which give them an anti-bacterial character as well as a chemical agent decomposing character with a specific effect against H-gases (blister gases) and V-gases (nerve gases). [Col. 1, lines 62-68; Col. 2, lines 1-2].

Reference AC, U.S. Patent No. 4,525,704, discloses a miniature enzymatic toxic gas sensor. Toxic nerve gases and organophosphorous pesticides act on the acetyl cholinesterase

enzyme in humans, therefore an agent detector, which is based on the deactivation of acetyl cholinesterase detects any such gas or pesticide. [Col. 2, line 42, 46-51].

Reference AR, McDaniel and Wild, "Detection of Organophosphorus Pesticide Detoxifying Bacterial Colonies Using UV-Photography of Parathion-Impregnated Filters," Arch. Environ. Contamin. Toxicol., Vol. 17(1988) 189-194, discloses a rapid filter-lift assay for the identification of bacteria capable of degrading organophosphorus pesticides. This article was authored by inventors McDaniel and Wild and was published on January 21, 1988.

Reference AS, Albizo et al., article, 1986, concerns an acetone dried preparation of Pseudomonas diminuta degrading GD. Hydrolysis was said faster in the preparations containing the plasmid encoding for the parathion hydrolase gene.

Reference AT, Wild et al., 1986, concerns two homologous organophosphate degrading genes (opd) which were identified from nonhomologous plasmids isolated from divergent soil bacteria.

Reference AU, Munnecke et al., "Pathways of Microbial Metabolism of Parathion," Appl. Environ. Microbiol., Vol. 31 (1976) 63-69, was incorporated into the specification of the subject patent application on page 4 at line 15 for the reasons set forth therein.

Reference AV, Sethunathan et al., "A Flavobacterium sp. that Degrades Diazinon and Parathion," Can. J. Microbiol., Vol. 19 (1973) 873-875, was incorporated into the specification on page 4 at line 15 for the reasons set forth therein.

Reference AW, Munnecke, "Microbial Degredation of Xenobiotics and Recalcitrant Compounds", Academic Press, Inc., London (1981) 251-269, was incorporated into the specification of the subject patent application on page 4 at line 17 for the reasons set forth therein.

Reference AX, Serdar, et al., "Plasmid Involvement in Parathion Hydrolysis by Pseudomonas diminuta," Appl. Environ. Microbiol., Vol. 44 (1982) 246-249, was incorporated into the specification, page 4 at line 30, for the reasons set forth therein.

Reference AY, Mulbry et al., "Identification of a Plasmid-Borne Parathion Hydrolase Gene from Flavobacterium sp. by Southern hybridization with opd from Pseudomonas diminuta," Appl. Environ. Microbiol., Vol. 51 (1986) 926-930, was incorporated into the specification of the subject patent application on page 4 at lines 30 and 34 for the reasons set forth therein.

Reference AZ, McDaniel, "Plasmid-Mediated Degradation of Organophosphate Pesticides," (1985) Ph.D. Dissertation, Texas A&M University, was incorporated into the specification of the subject patent application on page 4 at lines 30 and 34 for the reasons set forth therein.

Reference BA, Chaudhry et al., "Isolation of a Methyl Parathion-Degrading Pseudomonas sp. That Possesses DNA Homologous to the opd Gene from a Flavobacterium sp.," Appl. Environ. Microbiol., Vol. 54 (1988) 288-293, was incorporated into the specification of the subject patent application on page 4 at line 32 for the reasons set forth therein.

Reference BB, Merritt et al., "In vitro Degradation of Organophosphorus Insecticides by Pseudomonas aeruginosa Isolated from Fleece-Rot Lesions of Sheep," Austral. Vet. J., Vol. 57 (1981) 531, was incorporated into the specification of the subject patent application on page 4 at line 32 for the reasons set forth therein.

Reference BC, Serdar et al., "Enzymatic Hydrolysis of Organophosphates: Cloning and Expression of a Parathion Hydrolase Gene from Pseudomonas diminuta," Bio/Technology, Vol. 3 (1985) 567-571, describes the cloning of a plasmid encoded parathion hydrolase gene with low levels of expression of this gene in Pseudomonas diminuta and E. coli.

Reference BD, Brown, "Phosphotriesterases of Flavobacterium sp, Soil Biol. Biochem.," Vol. 12 (1980) 105-112, was incorporated into the specification of the subject patent application on page 5 at line 3 for the reasons set forth therein.

Reference BE, Chiang et al., "A Fruit Fly Bioassay with Phosphotriesterase for Detection of Certain Organophosphorus Insecticide Residues," Bull. Environ. Contam. Toxicol., Vol. 34

(1985) 809-814, was incorporated into the specification of the subject patent application on page 5 at line 3 for the reasons set forth therein.

Reference BF, Bolivar et al., "Construction and Characterization of New Cloning Vehicles II. A Multipurpose Cloning System," Gene, Vol. 2 (1977) 95-113, was incorporated into the specification of the subject patent application on page 21 at line 5 for the reasons set forth therein.

Reference BG, Messing et al., "Filamentous Coliphage M13 as a Cloning Vehicle: Insertion of a HindII Fragment of the lac regulatory region in M13 Replicative Form in vitro," Proc. Natl. Acad. Sci. USA, Vol. 74 (1977) 3642-3646, was incorporated into the specification of the subject patent application on page 21 at lines 5 and 21 for the reasons set forth therein.

Reference BH, Munch-Petersen et al., "Studies on the Acid-Soluble Nucleotide Pool in the Thymine Requiring Mutants of Escherichia coli During Thymine Starvation," Biochim. Biophys. Acta., Vol. 80 (1964) 542-551, was incorporated into the specification of the subject patent application on page 21 at line 13 for the reasons set forth therein.

Reference BI, Clewell et al., "Supercoiled Circular DNA-Protein Complex in Escherichia coli: Purification and Induced Conversion to an Open Circular DNA Form," Proc. Natl. Acad. Sci. USA, Vol. 62 (1969) 1159-1166, was incorporated into the specification of the subject patent application on page 21 at line 20 for the reasons set forth therein.

Reference BJ, Berns et al., "Isolation of High Molecular Weight DNA from Hemophilus influenzae," J. Mol. Biol., Vol. 11 (1965) 476-490, was incorporated into the specification of the subject patent application on page 21 at line 24 for the reasons set forth therein.

Reference BK, Casadaban et al., "In vitro Gene Fusions that Join Enzymatically Active beta-Galactosidase Segment to Amino-Terminal Fragments of Exogenous Proteins: Escherichia coli Plasmid Vectors for the Detection and Cloning of Translational Initiation Signals," J. Bacteriol., Vol. 143 (1980) 971-980, was incorporated into the specification of the subject patent application on page 22 at line 34 and on page 26 at line 11 for the reasons set forth therein.

Reference BL, Hewick et al., "A Gas-Liquid Solid Phase Peptide and Protein Sequenator," J. Biol. Chem., Vol. 256 (1981) 7990-7996, was incorporated into the specification of the subject patent application on page 23 at line 33 for the reasons set forth therein.

Reference BM, Frantz et al., "Organization and Nucleotide Sequence Determination of a Gene Cluster Involved in 3-Chlorocatechol Degradation," Proc. Natl. Acad. Sci. USA, Vol. 84 (1987) 4460-4464, was incorporated into the specification, page 24 at line 37, for the reasons set forth therein.

Reference BN, Maniatis et al., Molecular Cloning: A Laboratory Manual, (1982), Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, was incorporated in the specification on page 25 at line 36 for the reasons stated therein.

Reference BO, Luckow et al., "Signals Important for High-Level Expression of Foreign Genes in Autographa californica Nuclear Polyhedrosis Virus Expression Vectors," Virology, Vol. 167 (1988) 56-71, was incorporated into the specification of the subject patent application on page 26 at line 13 and on page 38 at line 8 for the reasons set forth therein.

Reference BP, Vaughan, "The Establishment of Two Cell Lines from the Insect Spodoptera frugiperda (Lepidoptera; Noctuidae)," In Vitro, Vol. 13 (1977) 213-217, was incorporated into the specification of the subject patent application on page 26 at line 25 for the reasons set forth therein.

Reference BQ, Hink, "Established Insect Cell Line from the Cabbage Looper, Trichoplusia ni," Nature, Vol. 226 (1970) 466-467, was incorporated into the specification of the subject patent application on page 26 at line 29 for the reasons set forth therein.

Reference BR, Smith et al., "Measurement of Protein Using Bicinchoninic Acid," Anal. Biochem., Vol. 150 (1985) 76-85, was incorporated into the specification of the subject patent application on page 28 at line 32 for the reasons set forth therein.

Reference BS, Laemmli, "Cleavage of Structural Proteins During the Assembly of the Head of Bacteriophage T4," Nature, Vol. 227 (1970) 680-685, was incorporated into the specification, page 28 at line 35, for the reasons set forth therein.

Reference BT, Wray et al., "Silver Staining of Proteins in Polyacrylamide Gels," Anal. Biochem., Vol. 118 (1981) 197-203, was incorporated into the specification, page 28 at line 36, for the reasons set forth therein.

Reference BU, Scopes et al., "The Use of Folsomia fimetaria and Drosophila melanogaster as Test Insects for the Detection of Insecticide Residues," Econ. Entomol., Vol. 60 (1967) 1539-1544, was incorporated into the specification, page 34 at line 18, for the reasons set forth therein.

Reference BV, Struck et al., "Purification of Hybrid beta-Galactosidase Protein Encoded by Φ X174 E Φ lacZ and Escherichia coli prlA Φ lacZ: Polypeptides Produced in Low Amounts," J. Mol. Appl. Genet., Vol. 3 (1985) 18-25, was incorporated into the specification, page 21 at line 7 and page 22 at line 33, for the reasons set forth therein.

Reference BW, Southern, "Detection of Specific Sequences Among DNA Fragments Separated by Gel Electrophoresis," J. Mol. Biol., Vol. 98 (1975) 503-517, was incorporated into the specification, page 42 at line 24, for the reasons set forth therein.

Reference BX, Harper et al., "Dissimilar Plasmids Isolated from Pseudomonas diminuta MG and a Flavobacterium sp. (ATCC 27551) Contain Identical opd Genes," Appl. Environ. Microbiol., Vol. 54 (1988) 2586-2589, was incorporated into the specification, page 7 at line 32, for the reasons set forth therein.

Reference BY, McDaniel, Harper and Wild, "Cloning and Sequencing of a Plasmid-Borne Gene (opd) Encoding a Phosphotriesterase," J. Bact., Vol. 170 (1988) 2306-2311, discusses cloning and sequencing techniques disclosed in the subject patent application. Inventors McDaniel and Wild and research associate, Harper, authored this article published in May 1988.

Reference BZ, Lewis et al., "Mechanism and Stereochemical Course at Phosphorus of the Reaction Catalyzed by a Bacterial Phosphotriesterase, Biochem.," Vol. 27 (1988) 1591-1597, was incorporated into the specification of the subject patent application on page 12 at line 30 and on page 32 at line 7 for the reasons set forth therein.

Reference CA, Benson, "A Rapid Procedure for Isolation of DNA Fragments from Agarose Gels," Biotechniques, March/April (1984) 66-67, was incorporated into the specification of the subject patent application on page 22 at line 4 for the reasons set forth therein.

Reference CB, M13 Cloning/Dideoxy Sequencing, (1980) Bethesda Research Laboratories Instruction Manual was incorporated into the specification of the subject patent application on page 22 at lines 10 and 19 for the reasons set forth therein.

Reference CC, Hoskin et al., 1982, discusses the hydrolysis of the nerve gas, Soman, when it is passed over a column of diisopropylphosphorofluoridate (DFP) coupled to agarose beads.

Reference CD, Munnecke, 1977, discloses that a crude cell extract with parathion hydrolase activity could be immobilized on ground glass, placed in a column and used to detoxify parathion solutions passed over it.

Reference CE, Munnecke, 1979, discusses the ability of a crude parathion hydrolase extract, which is bound to porous glass or porous glass beads, to hydrolyze residual parathion in industrial wastewaters.

Reference CF, Munnecke, 1980, discusses the use of a bacterial enzyme preparation to detoxify organophosphate pesticides in containers and as an enzyme detergent absorbed on cloth.

Reference CG, Loo et al, 1987 discusses the study of an E. coli mutant, initially deficient in organophosphate degrading ability, transformed with a cosmid library and a plasmid, which enables it to use ethylphosphonate as a sole phosphorus source during growth.

Reference CH, Pemberton, 1981, suggests that the use of in vivo and in vitro genetic engineering techniques may be used to construct bacteria with novel degradative abilities.

Respectfully submitted,

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